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Lists of Species

An updated checklist of the Thysanoptera of Panama with comments on host associations

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Abstract: An updated biological catalogue of the Thysanoptera of Panama is presented. As a result the new checklist presented here records 246 species, 87 of which were collected during a recent survey.

Introduction

Tropical forests play a fundamental role in key ecosystems processes, affecting the dynamics of regional and global climates. In addition, tropical ecosystems are reputed to support most of the world's biodiversity: almost countless species of animals and plants, a large number of which are still unknown. Less still is known about the complex web of interactions that weave these species into ecological communities. Thus, tropical forests represent one of the last great frontiers of biological exploration to which increasing numbers of scientists are flocking. Rates of tropical forest habitat degradation and destruction are higher than in almost any other biome and we are in danger of losing the vast majority of species before we have documented them (Lawton and May 1995). In comparison with most temperate ecosystems, Panamanian tropical ecosystems are characterized by extraordinarily high but poorly inventoried insect diversity, and by an absence of basic biological and ecological information (Godfray *et al*. 1999; Novotny *et al*. 2002). Information on the Neotropical species of the insect Order Thysanoptera is widely scattered (Mound and Marullo 1996). Here we attempt to summarize the available information concerning the biodiversity of these insects in Panama.

Thrips are particularly diverse in the tropics, and the species known from the Republic of Panama were first listed by Mound and Palmer (1992). That list included 175 species together with a historical review of the Thysanoptera. Also included was information on bionomics, distribution and a discussion of problems associated with the effective sampling of this group of insects in the field (Hood 1934; Mound and Palmer 1992; Bournier 1993; Mound and Marullo 1996; Sanchez-Monge *et al*. 2011). Laurence Mound has published extensively on the taxonomy of the Thysanoptera worldwide and has been at the forefront of developing our understanding of the phylogenetic, and hence systematic, relationships within the Thysanoptera (Mound and Palmer 1983; 1986; Mound 1989).

The present paper was produced in response to a 90 days research invitation to the senior author by the Department of Entomology of the University of Panama to implement a course on thrips taxonomy during 2008-2011. One of the targets was the identification of potential pest thrips species, especially *Thrips palmi* and *Frankliniella occidentalis*, using multimedia and e-learning methodology (Moritz *et al*. 2004). These courses provided an opportunity to further sample Panamian Thysanoptera, and as a result the new catalogue presented here records 246 species, 87 of which were newly collected during the study.

An additional target was to increase our knowledge of the association between thrips and natural plants on Barro Colorado Island and inland Panama. It is important to conduct plant-association surveys in order to understand the role of thrips in ecosystems, to ascertain which plant species support pest thrips (Mound and Marullo 1996), and to assess the impact of different thrips species on populations of other organisms within crops, amenity plantings and noncultivated areas. The thrips fauna of Panama cannot be considered a static entity. Not only are these insects particularly vagile, but populations of most species seem to increase and decrease rapidly. Moreover, new species are constantly being introduced accidentally, via the Panama Canal and airports due to the agricultural trade market. Other species can be expected to be lost through vegetational changes, including the construction of the new Canal that started in 2009.

The purpose of this paper is to list all recorded taxa, together with some indication of their biological characteristics, with the hope that by providing Panamanian students with an introduction to the recent literature on Thysanoptera, further studies on the biology and taxonomy of these insects will be facilitated.

Materials and Methods

Sampling sites (Figure 1). Agroecosystems: the sites selected varied from dry areas in Panama (Arco Seco, provinces of Herrera, Los Santos, Coclé, Veraguas and west area of Panama Province) to the humid regions of Chiriquí Province (Boquete), Bocas del Toro and Darien. Natural habitats: two sites were selected for general survey, Barro Colorado Island (BCI) and Pipeline Road. At 09°6’11” N, 79°50’48” W, BCI is a 1500-ha island in an artificial lake, created during construction of the Panama Canal in the early 1900s. Mean monthly temperature is 26°C with a maximum of 27°C in April. Annual rainfall averages 2600 mm. The dry season often begins in December and ends in April or May. Median rainfall between January and March is 84 mm. A more extensive description of the site can be found in Croat (1978), Windsor (1990) and Leigh *et al.* (1996). BCI is covered by a semi-deciduous tropical moist forest (Holdridge *et al.* 1971). The southern and western parts of the island are old forest (>400 y) whereas the remaining area is younger forest (100 y) with small clearings near the laboratory buildings. We chose a 3500-m transect to sample in the different environments on the island. Flowers were collected at least 2 m on each side of trails, making the total study area include > 1.4 ha. Pipeline Road is part of the 22,000-ha Parque Nacional Soberania (09°05’17” N, 79°35’51” W) located along the eastern side of Gatun Lake as close as 2 km from BCI. Average rainfall is higher than on BCI because the road runs in a south to north direction toward the Caribbean coast, which receives 3500 mm annual rainfall. We worked along km 4 to 10 on Pipe Road Line and near the town of Gamboa, for a minimum area of 2.8 ha. The park is composed of mature lowland forest with some roadside covered by 60-70-y old secondary forest. Secondary forest and disturbed habitat were more strongly represented here than on BCI. Transects were walked from early morning to early afternoon (BCI) or until late afternoon (PR). All the plants were identified with specialized botanical dichotomous keys and the names were checked in the IPNI database and The Plant List, a working list of all plant species (http://www.theplantlist.org/).

In general, thrips are most easily collected by beating flowers and vegetation, also dead branches and dead leaves, over a small plastic tray (see: http://anic.ento.csiro.au/thrips/). Thrips were killed in 60% ethanol and mounted on microscopic slides using Canada balsam. The tarsal arolium of thrips adheres to the surface whilst any excess of rubbish is blown away. The beating process is laborious but is the only way to collect thrips from individual leaves and flowers, and thus be more certain of their host association. For more details about collecting techniques and specimens preparation see Mound and Walker (1982; 1986) and Mound and Marullo (1996). Samples were carried out in July 1998 from different climatic areas of Panama, including the tropical area of Darien and Chiriqui composed of primary rain forest and cloud forest, and the dry area of Arco Seco, predominated by huge horticultural areas of rice, sugar and watermelon crops.

The catalogue is arranged systematically under families and the two largest families are each divided into two subfamilies. Genera are listed alphabetically within each family or subfamily. New records are indicated by an *. New information for the species previously collected in Panama by other scientists (sampling data) is also provided. Information on biological aspects of some thrips is given when avalaible. We considered as potential host plants those on which both sexes of thrips were collected, with larvae in the majority of the cases. It is not possible to be sure that these larvae correspond to the adults with morphological studies only, but it is a first step to try to identify feeding associations. In Table 1 we present data on the thrips collected in Agroecosystems and natural habitats. This checklist is based on our sampling (more than 10,000 slides have been made after the survey), together with published records. Nomenclature follows that is used in a web-based world checklist (Mound 2012) and all thrips collected during the present study were certified with the collection of Thysanoptera at

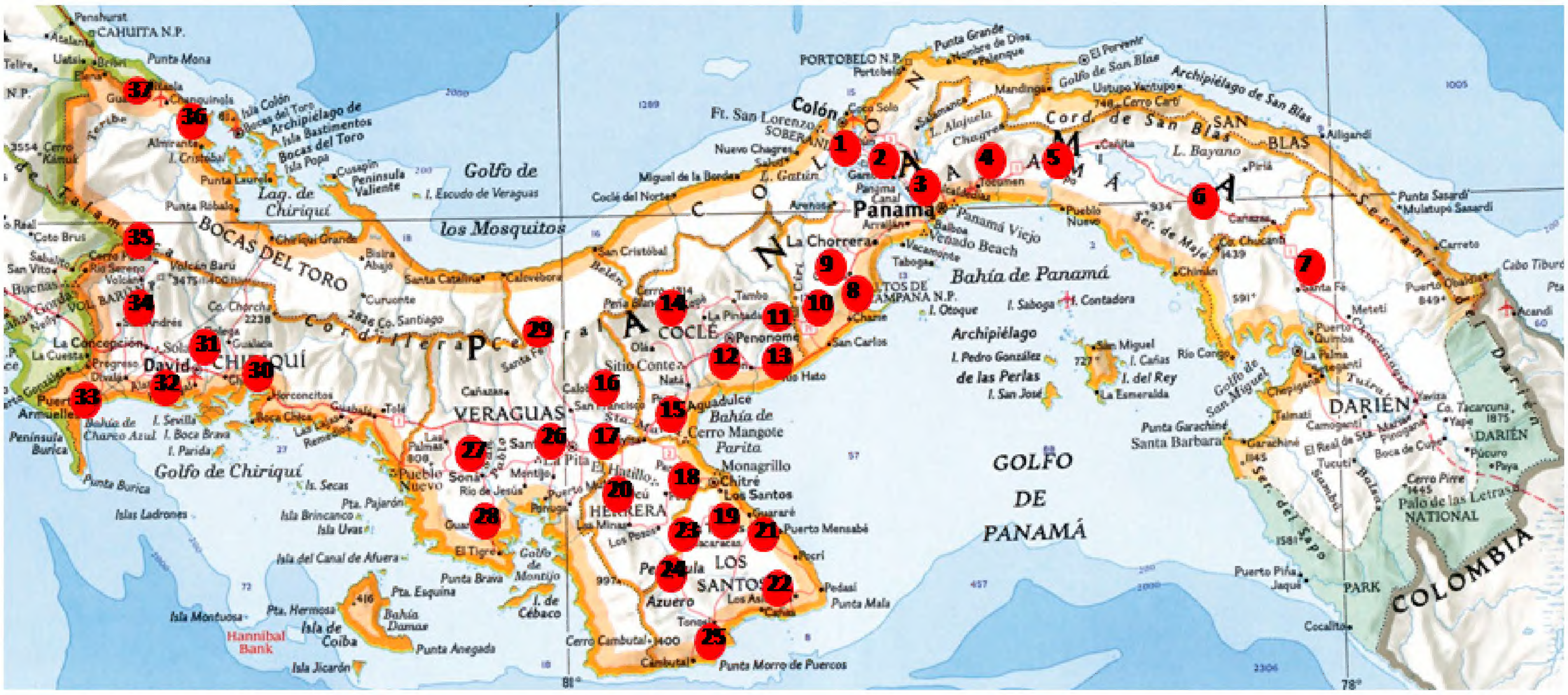

FIGURE 1. Sampling points. 1. Colón, 2 Barro Colorado Island, 3 Pipe Road Line, 4 Tocumen, 5 Chepo, 6 Tortí, 7 Santa Fé de Darién, 8 Chame, 9 La Chorrera, 10 Capira, 11 El Valle de Antón, 12 Penonomé, 13 Río Hato, 14 El Copé, 15 Agua Dulce, 16 Calobre, 17 Divisa, 18 Parita, 19 Los Santos, 20 Ocú, 21 Las Tablas, 22 Las Cañas, 23 Macaracas, 24 Carretera a Cerro Cambutal, 25 Tonosí, 26 Santiago, 27 Soná, 28 Guarumal, 29 Santa Fé de Veraguas, 30 Boquete, 31 Dolega, 32 David, 33 Puerto Arnuelles, 34 Volcán Barú, 35 Cerro Punta, 36 Almirante, 37 Guabito.

Darwin Center of the Department of Entomology (The Natural History Museum, London). The studied material is deposited in the Insect Collection of the Basque Institute of Research and Development (Neiker) in Spain.

Results and Discussion

Checklist of Species.

MEROTHRIPIDAE
Merothrips Hood, 1912
Merothrips floridensis Watson, 1927.
Merothrips morgani Hood, 1912.
AEOLOTHRIPIDAE
Aeolothrips Haliday, 1836
Aeolothrips microstriatus Hood, 1935.
Franklinothrips Back, 1912
Franklinothrips tenuicornis Hood, 1915.
Franklinothrips vespiformis (Crawford, 1909).
Stomatothrips Hood, 1912
**Stomatothrips flavus* Hood, 1912.
Stomatothrips septenarius Hood, 1925.

HETEROTHRIPIDAE
Heterothrips Hood, 1908
**Heterothrips angusticeps* Hood, 1954.
Heterothrips fimbriatus Hood, 1934.
Heterothrips flavicornis Hood, 1915.
Heterothrips flavitibia Moulton, 1932/*flavicruris* Hood, 1934.
Heterothrips minor Hood, 1915.
**Heterothrips prosopidis* Crawford JC, 1943.
Heterothrips pubescens Hood, 1934.
**Heterothrips sericatus* Hood, 1913.
**Heterothrips striatus* Moulton, 1932.
**Heterothrips* sp 1
**Heterothrips* sp.2

THRIPIDAE-PANCHAETOTHRIPINAE
Caliothrips Daniel, 1904
**Caliothrips fasciatus* (Pergande, 1895).
Caliothrips insularis (Hood, 1928).
Caliothrips nanus (Hood, 1928).
Caliothrips phaseoli (Hood, 1912).
Dinurothrips Hood, 1913
Dinurothrips hookeri Hood, 1913.
Elixothrips Stannard and Mitri, 1962
**Elixothrips brevisetis* (Bagnall, 1919).
Heliothrips Haliday, 1836
**Heliothrips haemorrhoidalis* (Bouché, 1833).
Hoodothrips Bondar, 1931
Hoodothrips brevipilus (Hood, 1928).
Selenothrips Karny, 1911
**Selenothrips rubrocinctus* (Giard, 1901).

THRIPIDAE-DENDROTHRIPINAE
Leucothrips Reuter, 1904
Leucothrips theobromae (Priesner, 1923).
Pseudodendrothrips Schmutz, 1913
Pseudodendrothrips mori (Niwa, 1908).

THRIPIDAE-SERICOTHRIPINAE
Hydatothrips Karny, 1913
**Hydatothrips guanacastei* Mound and Marullo, 1996.
Hydatothrips sternalis (Hood, 1935).
Neohydatothrips John, 1929
Neohydatothrips basilaris (Hood, 1941).
**Neohydatothrips gracilipes* (Hood, 1924).
Neohydatothrips inversus (Hood, 1928).
Neohydatothrips portoricensis (Morgan, 1925).
**Neohydatothrips signifer* (Priesner, 1932).
**Neohydatothrips williamsi* (Hood, 1928).

THRIPIDAE-THRIPINAE
Anaphothrips Uzel, 1985
**Anaphothrips obscurus* (Müller, 1776).
**Anaphothrips sudanensis* Trybom, 1911.
Anaphothrips sp.
Apterothrips Bagnall, 1908
Apterothrips apteris (Daniel, 1904).
Aptinothrips Haliday, 1836
**Aptinothrips rufus* Haliday, 1836.
Arorathrips Bhatti, 1990
**Arorathrips crassiscelis* (zur Strassen, 1967).
**Arorathrips fulvus* (Moulton, 1936).
Arorathrips mexicanus (Crawford DL, 1909).
Arorathrips xanthius (Hood, 1934).
Baileyothrips Kono and O'Neill, 1964
Baileyothrips limbatus (Hood, 1935).
Bolacothrips Uzel, 1895
**Bolacothrips striatopennatus* (Schmutz, 1913).
Bravothrips Johansen, 1986
**Bravothrips tibialis* (Crawford JC, 1948).
Bregmatothrips Hood, 1912
**Bregmatothrips venustus* Hood, 1912.
Caprithrips Faure, 1933
Caprithrips insularis Beshear, 1975.
Chaetanaphothrips Priesner, 1926
**Chaetanaphothrips leeuweni* (Karny, 1914).
Chaetanaphothrips orchidii (Moulton, 1907).
Chaetanaphothrips signipennis (Bagnall, 1914).
Chaetisothrips Priesner, 1957
**Chaetisothrips gardeniae* (Crawford JC, 1945).
Chaetisothrips striatus (Hood, 1935).
Coremothrips Hood, 1925
Coremothrips pallidus Hood, 1925.
Corynothrips Williams, 1913
Corynothrips cruentatus Hood, 1934.
Corynothrips stenopterus Williams, 1913.
Dendrothripoides Bagnall, 1923
Dendrothripoides innoxius (Karny, 1914).
Dichromothrips Priesner, 1932
**Dichromothrips orchidis* Priesner, 1932.
Echinothrips Moulton, 1911
**Echinothrips americanus* Morgan, 1913.
Echinothrips caribbeanus Hood, 1955.
Enneothrips Hood, 1935
Enneothrips flaviceps Hood, 1955.
Enneothrips gustaviae Hood, 1935.
Frankliniella Karny, 1910
**Frankliniella altura* Mound and Marullo, 1996.
Frankliniella ameliae Hood, 1925.
Frankliniella annulipes Hood, 1915.
Frankliniella bagnalliana Hood, 1925.
Frankliniella borinquen Hood, 1942.
Frankliniella brevicaulis Hood, 1937.
**Frankliniella breviseta* Moulton, 1948.
**Frankliniella bruneri* Watson, 1926.
Frankliniella brunnea Priesner, 1932.
Frankliniella cephalica (Crawford DL, 1910).
**Frankliniella chamulae* Johansen, 1981.
**Frankliniella cotubrusensis* Retana and Mound, 1995.
Frankliniella cubensis Hood, 1925.
Frankliniella curiosa Priesner, 1932.
**Frankliniella curta* Hood, 1942.
**Frankliniella desmodii* Mound and Marullo, 1996.
**Frankliniella distinguenda* Bagnall, 1919.
Frankliniella diversa Hood, 1935.
**Frankliniella fallaciosa* Priesner, 1933.
Frankliniella floydandrei Sakimura and O'Neill, 1979.
**Frankliniella fulvipennis* Moulton, 1933.
**Frankliniella fulvipes* Bagnall, 1919.
**Frankliniella fusca* (Hinds, 1902).
Frankliniella gardeniae Moulton, 1948.
**Frankliniella gossypiana* Hood, 1936.
**Frankliniella hansoni* Ratana and Mound, 1995.

Frankliniella insularis (Franklin, 1908).
Frankliniella invasor Sakimura, 1972.
**Frankliniella kelliae* Sakimura, 1981.
**Frankliniella kiesteri* Retana and Mound, 1995.
Frankliniella minuta (Moulton, 1907).
**Frankliniella occidentalis* (Pergande, 1895).
Frankliniella panamensis Hood, 1925.
**Frankliniella parvula* Hood, 1925.
Frankliniella pulchella Hood, 1935.
**Frankliniella schultzei* (Trybom, 1910).
**Frankliniella spinosissima* Johansen and Mojica-Guzman, 1989.
Frankliniella standleyana Hood, 1935.
**Frankliniella vargasi* Retana and Mound, 1995.
**Frankliniella varipes* Moulton, 1933.
**Frankliniella williamsi* Hood, 1915.
Frankliniella zeteki Hood, 1925.
**Frankliniella zurqui* Retana and Mound, 1995.
Microcephalothrips Bagnall, 1926
Microcephalothrips abdominalis (Crawford DL, 1910).
Plesiothrips Hood, 1915
Plesiothrips aberrans (Crawford JC, 1941).
Plesiothrips amblycauda Hood, 1925
Plesiothrips brunneus Hood 1936.
Plesiothrips octarthrus Hood, 1925.
Plesiothrips perplexus (Beach, 1896).
Psectrothrips Hood, 1937
Psectrothrips interruptus (Hood, 1957).
Psectrothrips palmerae Mound and Marullo, 1996.
Psectrothrips spadix (Hood, 1916).
Retanathrips Mound and Nickle, 2009
**Retanathrips funestus* (Hood, 1915).
Retanathrips silvestris (Hood, 1935).
Rhabdothrips Hood, 1933
Rhabdothrips albus Hood, 1933.
Rhamphothrips Karny, 1913
**Rhamphothrips pandens* Sakimura, 1983.
Salpingothrips Hood, 1935
Salpingothrips minimus Hood, 1935.
Scirtidothrips Hood, 1954
**Scirtidothrips torquatus* Hood, 1954.
Scirtothrips Shull, 1909
Scirtothrips manihoti (Bondar, 1924).
**Scirtothrips oligochaetus* (Karny, 1927).
Scirtothrips panamensis Hood, 1935.
Trichromothrips Priesner, 1930
**Trichromothrips xanthius* (Williams, 1917).
Thrips Linnaeus, 1758
**Thrips orientalis* (Bagnall, 1915).
**Thrips palmi* Karny, 1925.
**Thrips pallicornis* Hood, 1912.
**Thrips simplex* (Morison, 1930).
**Thrips tabaci* Lindeman, 1889.
**Thrips trehernei* Priesner, 1927.

PHLAEOTHRIPIDAE-IDOLOTHRIPINAE
Acallurothrips Bagnall, 1921
Acallurothrips breviceps (Hood, 1934).
Acallurothrips brunneus (Hood, 1934).
Acallurothrips conifer (Hood, 1925).
Acallurothrips flavus (Hood, 1934).
Actinothrips Bagnall, 1909
Actinothrips trichaetus Hood, 1935.
Anactinothrips Bagnall, 1909
Anactinothrips gustaviae Mound and Palmer, 1983.
Anactinothrips nigricornis Hood, 1936.
Azeugmatothrips Mound and Palmer, 1983
Azeugmatothrips obrieni (Johansen and García, 1980).
Compsothrips Reuter, 1901
Compsothrips graminis (Hood, 1936).
Diceratothrips Bagnall, 1908
Diceratothrips bicornis Bagnall, 1908.
Diceratothrips nigricauda (Hood, 1925).
Diceratothrips picticornis Hood, 1914.
Elaphrothrips Buffa, 1909
Elaphrothrips affinis (Bagnall, 1908).
**Elaphrothrips dampfi* Hood, 1940.
**Elaphrothrips foveicollis* (Bagnall, 1908).
**Elaphrothrips laevicollis* (Bagnall, 1910).
Ethirothrips Karny, 1925
Ethirothrips angusticornis (Bagnall, 1924).
Ethirothrips brevis (Bagnall, 1921).
Gastrothrips Hood, 1912
Gastrothrips abditus Hood, 1935.
Gastrothrips anolis Morgan, 1925.
Gastrothrips stygicus Hood, 1935.
Neosmerinthothrips Schmutz, 1913
Neosmerinthothrips nigrisetis (Hood, 1935).
Neosmerinthothrips parvidens (Hood, 1935).
Nesothrips Kirkaldy, 1907
Nesothrips lativentris (Karny, 1913).
Phacothrips Mound, 1974
Phacothrips ocelloides (Hood, 1950).
Pseudocryptothrips Priesner, 1919
Pseudocryptothrips gradatus (Hood, 1925).
Pygothrips Hood, 1915
Pygothrips zeteki Hood, 1934.
Zeugmatothrips Priesner, 1925
**Zeugmatothrips hoodi* Priesner, 1927.
Zeugmatothrips priesneri Hood, 1935.

PHLAEOTHRIPIDAE-PHLAEOTHRIPINAE
Adraneothrips Hood, 1925
Adraneothrips albicollis Hood, 1935.
Adraneothrips alternatus Hood, 1925.
Adraneothrips bilineatus Hood, 1935.
**Adraneothrips desocellatus* (Priesner, 1933).
Adraneothrips diligens Hood, 1935.
Adraneothrips fuscicollis Hood, 1925.
**Adraneothrips tibialis* (Hood, 1914).
**Adraneothrips uniformis* Hood, 1925.
Aleurodothrips Franklin, 1909
**Aleurodothrips fasciapennis* (Franklin, 1908).
Androthrips Karny, 1911
**Androthrips ramachandrai* Karny, 1926.
Bamboosiella Ananthakrishnan, 1957
Bamboosiella cingulata (Hood, 1919).
Bradythrips Hood and Williams, 1925
Bradythrips hesperus Hood and Williams 1925.
Carathrips Hood, 1938
Carathrips delicatulus (Hood, 1939).
Carathrips mediamericanus (Hood, 1934).
Carathrips rufescens (Hood, 1942)
Chirothripoides Bagnall, 1915
**Chirothripoides typicus* Bagnall, 1915.
Docessissophothrips Bagnall, 1908
Docessissophothrips corticis (Hood, 1914).
Eupathithrips Bagnall, 1908
Eupathithrips affinis Bagnall, 1915.
**Eupathithrips meizon* Hood, 1955.
Eupathithrips silvestrii (Buffa, 1908).
Eurythrips Hinds, 1902
Eurythrips ampliventralis Hinds, 1902.
**Eurythrips batesi* (Watson, 1935).
Eurythrips hookae Hood, 1934.
Eurythrips modestus (Bagnall, 1917).
**Eurythrips tristis* Hood, 1941.
Eurythrips umbrisetis Hood, 1933.
Gomphiothrips Moulton, 1933
**Gomphiothrips mercedes* Mound and Marullo, 1996.
Gynaikothrips Zimmermann, 1900
Gynaikothrips ficorum (Marchal, 1908)
**Gynaikothrips uzeli* (Zimmermann, 1900).
Haplothrips Amyot and Serville, 1843
**Haplothrips gowdeyi* (Franklin, 1908).
Haplothrips graminis Hood, 1912.
**Haplothrips saidi* (Retana –Salazar and Soto Rodriguez, 2007).
Holopothrips Hood, 1914
**Holopothrips inquilinus* (Bournier, 1993).

Holopothrips signatus Hood, 1914.
Holopothrips tenuis Hood, 1914.
Holothrips Karny, 1911
Holothrips connaticornis (Hood, 1925).
Holothrips ramuli (Hood, 1934).
Hoplandrothrips Hood, 1912
**Hoplandrothrips affinis* Hood, 1915.
Hoplandrothrips erythrinae Priesner, 1925.
**Hoplandrothrips flavipes* Bagnall, 1923.
Hoplandrothrips nigricestus Hood, 1933.
**Hoplandrothrips jennei* (Jones, 1912).
Hoplandrothrips xanthopoides Bagnall, 1917.
Hoplothrips Amyot and Serville, 1843
Hoplothrips bradleyi Hood, 1950.
Hoplothrips graminis (Hood, 1934).
Hoplothrips militaris (Hood, 1934).
Hoplothrips moultoni (Hood, 1934).
Hoplothrips occipitalis (Hood, 1934).
Hoplothrips orbiceps (Hood, 1934).
Hoplothrips tyrannus (Hood, 1933).
Hoplothrips zonatus (Hood, 1914).
Karnyothrips Watson, 1923
Karnyothrips melaleucus (Bagnall, 1911).
Karnyothrips merrilli (Watson, 1920).
Karnyothrips ochropezus Hood, 1934.
Leptothrips Hood, 1909
Leptothrips vittipennis Hood, 1938.
Liothrips Uzel, 1895
Liothrips antennatus Priesner, 1933.
Liothrips araliae Hood, 1935.
Liothrips avocadis Hood, 1935.
Liothrips barronis Hood, 1936.
Liothrips bispinosus Hood, 1938.
Liothrips cordiae Hood, 1935.
Liothrips neosmerinthi Mound and Palmer, 1992.
Liothrips penetralis Hood, 1935.
Liothrips sulcifrons (Hood, 1936).
Liothrips zeteki Hood, 1913.
Macrophthalmothrips Karny, 1922
Macrophthalmothrips helenae Hood, 1934.
Macrophthalmothrips hemipteroides (Priesner, 1921).
Macrophthalmothrips kiesteri Mound, 1987.
Metriothrips Hood, 1936
Metriothrips midas Hood, 1936.
Neurothrips Hood, 1924
Neurothrips williamsi Hood, 1925.
Pistillothrips Johansen, 1982
**Pistillothrips guadalupae* Johansen, 1982.
Plectrothrips Hood, 1908
Plectrothrips latus Hood, 1941.
Pristothrips Hood, 1925
Pristothrips albipunctatus Hood, 1925.
Pristothrips pollostus Mound and Marullo, 1996.
Psalidothrips Priesner, 1932
**Psalidothrips longistylus* Okajima, 1983.
Pygmaeothrips Karny, 1920
Pygmaeothrips angusticeps (Hood, 1908).
Sedulothrips Bagnall, 1915
Sedulothrips tristis Hood, 1934.
Sedulothrips vigilans (Hood, 1913).
Sophiothrips Hood, 1934
Sophiothrips panamensis Hood, 1934.
**Sophiothrips spadix* Hood, 1954.
Sophiothrips squamosus Hood, 1934.
Stegothrips Hood, 1934
Stegothrips barronis Hood, 1934.
Stephanothrips Trybom, 1913
Stephanothrips occidentalis Hood and Williams, 1925.
Strepterothrips Hood, 1934
Strepterothrips conradi Hood, 1934.
Symphyothrips Hood and Williams, 1915
Symphyothrips punctatus Hood and Williams, 1915.
Terthrothrips Karny, 1925
**Terthrothrips gracilicornis* (Hood, 1925).
Trachythrips Hood, 1930
Trachythrips albipes Hood, 1933.
Trachythrips deleoni Hood, 1933.
Trachythrips frontalis Hood, 1933.
Trichinothrips Bagnall, 1929
Trichinothrips panamensis Hood, 1935.
Tropothrips Hood, 1949
**Tropothrips nigripes* Stannard, 1954.
Trybomia Karny, 1911
Trybomia intermedia (Bagnall, 1910).
Tylothrips Hood, 1937
Tylothrips clavivestis (Hood, 1935).
**Tylothrips osborni* (Hinds, 1902).
Williamsiella Hood, 1925
Williamsiella bicoloripes Hood, 1925.
Williamsiella breviceps (Hood, 1925).
Williamsiella morgani (Hood, 1941).

Comments on species

AEOLOTHRIPIDAE

***Aeolothrips microstriatus* Hood, 1935.**
This species is based on one male collected in Panama and cannot at present be placed satisfactorily into this genus (Mound and Marullo 1996). Feeding associations: probably predatory on small insects in flowers of trees. We collected it in Chiapas (Mexico) (Rocha *et al*. 2012) and Panama in flowers of *Mangifera indica*.

***Franklinothrips vespiformis* (Crawford, 1909).**
Sampling data: 9 females collected in grasses in dried and humid areas of Panama.

***Stomatothrips flavus* Hood, 1912.**
New records: Dos Bocas, grass, 5/IX/2007, 1 female.

HETEROTHRIPIDAE

***Heterothrips angusticeps* Hood, 1954.**
New records: Barro Colorado Island, *Anacardium excelsum*, 3/IV/1996, 6 females and 1 male; *Anacardium excelsum*, 13/III/1995, 16 females and 3 males. Feeding associations: *Anacardium excelsum* (Anacardiaceae).

***Heterothrips fimbriatus* Hood, 1934.**
This species was originally described from a single female collected in Panama (Mound and Marullo 1996). Sampling data: Tocumen, Cargo Airport, *Byrsonima crassifolia*, 29/V/2009, 3 females. Feeding associations: *Byrsonima* sp. (Malpighiaceae).

***Heterothrips flavicornis* Hood, 1915.**
Mound and Marullo (1996) recorded this species in Panama on *Byrsonima* flowers. Sampling data: 3 females in flowers of *Byrsonima crassifolia.* Feeding associations: *Byrsonima* spp., (Malpighiaceae).

***Heterothrips flavitibia* Moulton, 1932/*flavicruris* Hood, 1934.**
Both species cannot at present be distinguished satisfactorily. Mound and Marullo (1996) stated that *H. flavicruris* was described on a single female from Panama and *H. flavitibia* was described based on two females from

Brazil. Sampling data: 73 females and 25 males have been collected. Feeding associations: *Byrsonima* sp. and *Hiraea* sp. (Malpighiaceae) and *Serjania cornigera* (Sapindaceae).

***Heterothrips minor* Hood, 1915.**
This species was described from Panama from the flowers of *Byrsonima crassifolia* and was collected in Costa Rica (Mound and Marullo 1996). Sampling data: 28 females and 2 males have been collected. Feeding associations: *Byrsonima* sp. (Malpighiaceae).

****Heterothrips prosopidis* Crawford JC, 1943.**
New records: *Hiraea grandifolia*, 5/XII/1994, 1 female and 1 male; Chiriqui, Paso Canoas, *Arachis pintoi*, 05/VII/2010, 1 female. Feeding associations: *Hyraea* sp. (Malpighiaceae).

***Heterothrips pubescens* Hood, 1934.**
This species was described from Panama from *Byrsonima* trees (Mound and Marullo 1996). Sampling data: 37 females and 3 males have been collected. Feeding associations: *Byrsonima* sp, (Malpighiaceae).

****Heterothrips sericatus* Hood, 1913.**
New records: Las Paredes, *Bixa orellana*, 31/XII/2007, 1 female; Pipe Road Line: *Luehea seemannii*, 2/III/1996, 5 females and 3 males; *Miconia impetiolaris var. pandurifolia*, 21/IV/1996, 1 male.

****Heterothrips striatus* Moulton, 1932.**
New records: Pipe Road Line: *Inga sp.,* 26/I/1996, 11 females; *Luehea seemannii*, 2/III/1996, 1 female.

****Heterothrips* sp 1**
New records: 14 females and 7 males in flowers of *Byrsonima crassifolia* Valle de Antón, 22/IV/2009.

****Heterothrips* sp.2**
New records: 7 females and 4 males in flowers of *Byrsonima crassifolia*, Valle de Antón, 21/IV/2009.

THRIPIDAE-PANCHAETOTHRIPINAE

****Caliothrips fasciatus* (Pergande, 1895).**
New records: Valle de Antón, Fabaceae flower, 22/IV/2009, 2 females; Loma Linda, grass, 31/VIII/2007, 1 female. Feeding associations: It is a polyphagous species and is sometimes recorded as a pest of crops including beans.

***Caliothrips insularis* (Hood, 1928).**
Sampling data: 2 females and 1 male in grass in the dry province of Central Panama. Feeding associations: Grasses (Poaceae).

***Caliothrips nanus* (Hood, 1928).**
Collected in Gamboa in *Macuna* leaves and in Barro Colorado Island in leaves of *Arrabidea verrucosa* (Mound and Marullo 1996). Sampling data: 18 females and 1 male. Feeding associations: *Glyciridia sepium* (Fabaceae).

***Caliothrips phaseoli* (Hood, 1912).**
Sampling data: 11 females and 3 males have been collected. Feeding associations: Fabaceae. Valle de Antón, Asteraceae flowers, 22/IV/2009, 5 females and 2 males; Valle de Antón, grass, 22/IV/2009, 2 females and 1 male.

***Dinurothrips hookeri* Hood, 1913.**
Sampling data: 3 females and 1 male have been collected. Feeding associations: Polyphagous.

****Elixothrips brevisetis* (Bagnall, 1919).**
New records: University of Panama, grass, 19/IV/2009, 1 female. Feeding associations: Probably grasses (Poaceae) although there are specimens in the USNM collection taken in quarantine on plants from Surinam and the Virgin Islands (Mound and Marullo 1996).

****Heliothrips haemorrhoidalis* (Bouché, 1833).**
New records: 4 females have been collected. Feeding associations: Polyphagous on a wide range of tree crops from *Citrus* sp. and *Persea americana* to *Pinus* sp. and found worldwide in temperate areas.

***Hoodothrips brevipilus* (Hood, 1928).**
Sampling data: 5 females. Feeding associations: Probably grasses (Poaceae).

****Selenothrips rubrocinctus* (Giard, 1901).**
New records: we have collected 11 females on dried leaves of plants. Feeding associations: Probably a pest of tree crops including *Bixa orellana* (Bixaceae), *Theobroma cacao* (Sterculiaceae), *Anacardium occidentale* (Anacardiaceae) and *Eucalyptus* tree leaves (Mound and Marullo 1996).

THRIPIDAE-DENDROTHRIPINAE

***Leucothrips theobromae* (Priesner, 1923).**
Collected on *Cochlospermum vitifolium* young leaves (Mound and Marullo 1996). Sampling data: Veraguas, La Yeguada, *Tabebuia chrysostricha*, 14/II/2010, 1 female. Feeding associations: Young leaves of *Cochlospermum vitifolium* (Cochlospermaceae) in Panama and young leaves of *Ricinus* (Euphorbiaceae) in Costa Rica (Mound and Marullo 1996).

THRIPIDAE-SERICOTHRIPINAE

****Hydatothrips guanacastei* Mound and Marullo, 1996.**
This species was described from a single female in Costa Rica (Mound and Marullo 1996). Here, it is recorded from Panama for the first time: Sora, Manglarito, *Ocimum* sp., 20/VI/2009, 4 females. Feeding associations: Mound and Marullo collected the holotype, (one female), on leaves of *Acacia* sp. in Costa Rica. We have found in *Ocimum* leaves (Lamiaceae).

***Hydatothrips sternalis* (Hood, 1935).**
L.A. Mound collected 8 females and 1 male in Barro Colorado Island (Panama). Sampling data: 54 females and 1 male have been collected. Feeding associations: Mound and Marullo (1996) collected 8 females and 1 male on apical leaves of *Acalypha diversifolia* (Euphorbiaceae) in Panama. We have found both sexes in dried leaves of

Conostegia sp and *Clidemia* sp. (Melastomataceae).

***Neohydatothrips gracilipes* (Hood, 1924).**
New records: Valle de Antón, *Cucumis melo*, 22/IV/2009, 1 female. Feeding associations: Mound and Marullo (1996) collected 20 females from *Sida rhombifolia* (Malvaceae) in Costa Rica.

***Neohydatothrips inversus* (Hood, 1928).**
Collected by Hood in Barro Colorado Island under the name *N. geminus* (Mound and Marullo 1996). Sampling data: 5 females and 1 male have been collected. Feeding associations: Mound and Marullo (1996) studied 41 females and 16 males on *Coursetia arborea* leaves (Fabaceae) in Trinidad and 4 females and 4 males on leaves of *Andira inermis* (Fabaceae) in Puerto Rico. We have found isolated females in dried leaves of grasses.

***Neohydatothrips signifer* (Priesner, 1932).**
New records: El Valle, Corotu, *Enterolobium cyclocarpum*, 17/VI/2009, 1 female. Feeding associations: Mound and Marullo (1996) collected both sexes and larvae in leaves of *Brickellia argyrolepsis* (Astearaceae), and 10 females on leaves of *Wigandia urens* (Asteraceae).

***Neohydatothrips williamsi* (Hood, 1928).**
New records: El Valle, *Manihot esculenta*, 17/VI/2009, 1 female; Porto Bello, *Manihot esculenta*, 23/06/2009, 1 female. Feeding associations: Unknown. The species is known only from the holotype female which was collected on the Virgin Islands (Mound and Marullo 1996).

THRIPIDAE-THRIPINAE

***Anaphothrips obscurus* (Müller, 1776).**
New records: Panama West area, *Cucumis sativa*, 2007, 1 female. Feeding associations: Grasses, (Poaceae).

***Anaphothrips sudanensis* Trybom, 1911.**
New records: 11 females have been collected mainly in grasses. Feeding associations: Grasses, (Poaceae), it is a worldwide pest of cereal crops in tropical and subtropical areas.

***Anaphothrips* sp.**
Barro Colorado Island: *Gustavia superba*, 1/V/96, 1 female.

***Aptinothrips rufus* Haliday, 1836.**
New records: Cerro Punta, *Brassica campestris*, 24/V/2009, 1 female. Feeding associations: Grasses, (Poaceae).

***Arorathrips crassiscelis* (zur Strassen, 1967).**
New records: Palmas Bellas, *Vigna* sp., 24/VI/2009, 1 female. Feeding associations: Grasses, (Poaceae).

***Arorathrips fulvus* (Moulton, 1936).**
New records: Capira, Western Panama, *Baltimora recta*, 11/VII/2008, 1 female; INA, Divisa, *Eleusine indica*, 9/III/2007, 2 females; Comayaguas, *Cucumis melo*, 29/X/2009, 2 females and 1 male. Feeding associations: Grasses, (Poaceae).

***Arorathrips mexicanus* (Crawford DL, 1909).**
We collected 3 females and one male in grasses. Feeding associations: Grasses, (Poaceae).

***Arorathrips xanthius* (Hood, 1934).**
Described from a single female taken in Panama (Mound and Marullo 1996). We collected 15 females and 20 males in grasses. Feeding associations: Grasses (Poaceae).

***Baileyothrips limbatus* (Hood, 1935).**
Twenty three females and 5 males were collected on *Chamaesyce hyssopifolia* (Euphorbiaceae) in Barro Colorado Island (Mound and Marullo 1996). We collected 18 females and 9 males. Feeding associations: Euphorbiaceae.

***Bolacothrips striatopennatus* (Schmutz, 1913).**
Suris *et al.* (2008) recorded this genus for Cuba. New record: Chitré, grasses, 21/VIII/2010 1 female and 2 males. Feeding associations: Grasses, (Poaceae).

***Bravothrips tibialis* (Crawford JC, 1948).**
New records: Chiriquí, *Rosa* sp., 12/VI/2008, 1 female; Boquete, Chiriquí, *Rosa* spp., 17/IV/2010, 1 female; Chiriquí, Cerro Punta, *Brugmansia arborea*, 18/IV/2010, 1 female. Feeding associations: Probably species of Solanaceae (*Datura*, *Brugmansia*, *Solanum*).

***Bregmatothrips venustus* Hood, 1912.**
We have collected 22 females and 15 males. Feeding associations: Probably grasses, (Poaceae).

***Caprithrips insularis* Beshear, 1975.**
One female collected by L.A. Mound in Barro Colorado Island from *Axonopus* (Poaceae) and 1 female at base of grasses (Mound and Marullo 1996). Sampling data: 2 females. Feeding associations: Grasses, (Poaceae).

***Chaetanaphothrips leeuweni* (Karny, 1914).**
New records: Santa Fé de Veraguas, *Capsicum* sp., 17/IX/2007, 1 female; Veraguas, La Yeguada, *Tabebuia chrysostricha*, 14/II/2010, 1 female. Feeding associations: Associated with damage to bananas (Bhatti 1980).

***Chaetanaphothrips orchidii* (Moulton, 1907).**
Sampling data: 1 male. Feeding associations: Orchidaceae and Musaceae.

***Chaetanaphothrips signipennis* (Bagnall, 1914).**
Sampling data: 2 females and 2 males. Feeding associations: Musaceae.

***Chaetisothrips gardeniae* (Crawford JC, 1945).**
New records: Altos de María, *Celosia argentea*, 20/VI/2009, 2 females and 9 males; Tocumen, *Anacardium occidentale*, 7/IV/1996, 1 female. Feeding associations: Rubiaceae (*Hamelia* sp. and *Randia* sp.) and Amaranthaceae (*Celosia* sp.).

***Chaetisothrips striatus* (Hood, 1935).**
Sakimura (1967; 1969) recorded this species from Panama

and Honduras and L.A. Mound collected in Panama City from *Cassia moschata* (Mound and Marullo 1996). Sampling data: 1 female. Feeding associations: Unknown

***Coremothrips pallidus* Hood, 1925.**
This species was described from Panama and was collected on *Cochlospermum vitifolium* leaves near Gamboa by L.A. Mound (Mound and Marullo 1996). Feeding associations: Unknown.

***Corynothrips stenopterus* Williams, 1913.**
Sampling data: 12 females. Feeding associations: *Manihot esculenta*.

***Dendrothripoides innoxius* (Karny, 1914).**
Sampling data: 13 females and 4 males. Feeding associations: Leaves of *Ipomoea* sp. (Mound and Marullo 1996).

****Dichromothrips orchidis* Priesner, 1932.**
New records: Loma Linda, Orchidaceae (*Vanda* sp.), 31/VIII/2007, 120 females. Feeding associations: Orchidaceae.

****Echinothrips americanus* Morgan, 1913.**
New records: Riba Smith, *Dianthus caryophyllus*, 31/VIII/2007, females and 1 male; Cerro Azul, 30/VIII/2007, Asteraceae flowers 1 male. Feeding associations: It is a pest in temperate areas. In the United States it is common in Euphorbiaceae (*Euphorbia pulcherrima*), and *Impatiens* sp. (Balsaminaceae).

****Frankliniella altura* Mound and Marullo, 1996.**
New records: El Valle de Antón, Coclé, *Amaranthus spinosus*, 1/VIII/2008, 1 female. Feeding associations: Mound and Marullo (1996) collected males and females in *Acalypha* leaves (Euphorbiaceae) in Costa Rica.

***Frankliniella borinquen* Hood, 1942.**
Sampling data: 578 females and 33 males. Feeding associations: we have collected females and males in *Mangifera indica* (Anacardiaceae), *Miconia argentea*, *Miconia impetiolaris* (Melastomataceae) and *Tithonia diversifolia* (Asteraceae).

***Frankliniella brevicaulis* Hood, 1937.**
Sampling data: 24 females and 4 males. Feeding associations: Mound and Marullo collected females and males in flowers of *Zea mays* in Costa Rica. We have collected in flowers of *Zea mays* (Poaceae) and other species of grasses.

****Frankliniella breviseta* Moulton, 1948.**
New record: Barro Colorado Island, *Inga umbellifera*, 3 females. Feeding associations: Unknown.

****Frankliniella bruneri* Watson, 1926.**
We have collected 185 females and 22 males. Feeding associations: We have found females and males in flowers of *Brunfelsia pauciflora* (Solanaceae), *Cucurbita pepo* (Cucurbitaceae) and *Tabebuia chrysostricha* (Bignoniaceae).

***Frankliniella brunnea* Priesner, 1932.**
Sampling data: 508 females and 164 males. Feeding associations: We have collected females and males in *Chrysanthemum* sp., *Helianthus annus*, *Tagetes* sp., *Tridax procumbens* (Compositae) and in some Rubiaceae (*Psychotria* sp.) and Convolvulaceae (*Maripa* spp.)

***Frankliniella cephalica* (Crawford DL, 1910).**
Widespread in the Caribbean as well as from most of the mainland countries between Mexico and Colombia (Mound and Marullo 1996).
Sampling data: 1240 females and 359 males. Feeding associations: This small thrips is one of the most ubiquitous and widespread flower-living species in the Caribbean. It has been recorded from a wide range of flowers in Panama, Chiapas (Mexico), Dominican Republic and Honduras (Goldarazena unpublished data). Mound and Marullo found both sexes in flowers of *Mangifera indica* (Anacardiaceae) and *Ligustrum arboreum* (Oleaceae) in Costa Rica. We have found both sexes in *Clibadium surinamense, Melanthera aspera* and *Wedelia trilobata* (Compositae), *Mimosa pudica* (Fabaceae), *Cochlospermum vitifolium* (Cochlospermaceae), *Dioclea panamensis* (Boraginaceae) and *Lagerstroemia speciosa* (Lythraceae).

****Frankliniella chamulae* Johansen, 1981.**
New record: Valle de Antón, Asteraceae, 22/IV/2009, 1 female. Feeding associations: Unknown.

****Frankliniella cotobrusensis* Retana and Mound, 1995.**
We have found 32 females. Feeding associations: Unknown. Collected at montane sites in Panama. Retana and Mound (1995) collected at two montane sites in Costa Rica.

***Frankliniella curiosa* Priesner, 1932.**
Sampling data: 9 females and 3 males. Feeding associations: This species was originally described from Mexico. We have found females and males in *Serjania cornigera* (Sapindaceae) and *Vernonia arborescens* (Compositae).

****Frankliniella curta* Hood, 1942.**
We have collected 15 females and 1 male. Feeding associations: apparently widespread in a variety of flowers of the Compositae. Accordingly, we have found it repeatedly in *Heterocondylus vitalbae* flowers.

****Frankliniella desmodii* Mound and Marullo, 1996.**
We have collected 67 females and 12 males. Feeding associations: Mound and Marullo found both sexes in leaves of *Desmodium intortum* (Fabaceae) in Costa Rica. We have found females and males in *Inga goldmanii* (Fabaceae), *Vernonanthura patens* (Astearaceae) and *Anacardium occidentale* (Anacardiaceae).

****Frankliniella distinguenda* Bagnall, 1919.**
We have collected 115 females and 28 males. Feeding associations: We have collected both sexes in flowers of *Carica papaya* (Caricaeae), *Odontadenia macrantha* (Apocynaceae), *Clibadium surinamense* and *Vernonia canescens* (Compositae).

***Frankliniella diversa* Hood, 1935.**
Sampling data: Barro Colorado Island: *Laetia thamnia*, 25/V/1995, 1 female. Feeding associations: Unknown. This species was described by Hood (1935) on a unique specimen from Panama and posteriorly a second female was collected in Costa Rica (Mound and Marullo 1996). Recorded as a pollinator of *Castillia elastica* (Moraceae) in Panama (Sakai 2001).

***Frankliniella fallaciosa* Priesner, 1933.**
New records: Pipe Road Line: *Helicteres guazumaefolia*, 20/IV/1995, 1 female. Feeding associations: Described from Mexico, Mound and Marullo (1996) collected both sexes in flowers of *Vaccinium consanguineum* (Ericaeae) in Panama.

***Frankliniella floydandrei* Sakimura and O'Neill, 1979.**
Only the holotype female of this species collected near the Panama Canal is known (Mound and Marullo 1996). Sampling data: Barro Colorado Island: *Miconia nervosa*, 23/X/95, 1 female. Feeding associations: Unknown.

***Frankliniella fulvipennis* Moulton, 1933.**
We have collected 282 females and 56 males. Feeding associations: Mound and Marullo recorded *Megaskepasma* sp. (Acanthaceae) as a breeding plant for this species. We have found females and males in flowers of *Cochlospermum vitifolium* (Cochlospermaceae), *Helicteres guazumaefolia* (Sterculiaceae), *Conostegia speciosa* (Melastomataceae), *Mucuna mutisiana* (Fabaceae), *Tridax procumbens* (Compositae), *Rhynchospora cephalotes* (Cyperaceae).

***Frankliniella fulvipes* Bagnall, 1919.**
We have found 114 females and 143 males. Feeding associations: Solanaceae (Mound and Marullo 1996). We have found both sexes in *Solanum hayesii* (Solanaceae), *Inga goldmanii* (Fabaceae), *Tridax procumbens* and *Heterocondylus vitalbae* (Compositae).

***Frankliniella fusca* (Hinds, 1902).**
New record: Barro Colorado Island, *Mangifera indica*, 25/XI/1995, 2 females. Feeding associations: Solanaceae.

***Frankliniella gardeniae* Moulton, 1948.**
Seven females and 3 males were collected by L.A. Mound in Barro Colorado Island in flowers of *Arrabidaea verrucosa* and 4 females on *Pseudobombax* (Mound and Marullo 1996). Sampling data: 636 females and 64 males have been collected. Feeding associations: Described from Mexico, it is one of the most common yellow-bodied flower-living species in Panama. It has been collected in many habitats and at a wide range of altitudes. Males and females were collected in *Dioclea wilsonii, Dioclea guaianensis* (Boraginaceae), *Cydista aequinoctialis*, *Jacaranda copaia* (Bignoniaceae), *Vernonia patens* (Compositae), *Pseudobombax septenatum* (Bombaceae), *Maripa panamensis* (Convolvulaceae), *Miconia impetiolaris* (Melastomataceae)

***Frankliniella gossypiana* Hood, 1936.**
New record: Pipe Road Line: *Heterocondylus vitalbae*, 21/IV/1996, 1 female. Feeding associations: Mound and Marullo (1996) recorded *Ipomoea* flowers and leaves (Convolvulaceae) as a host plant in Costa Rica.

***Frankliniella hansoni* Ratana and Mound, 1995.**
New record: *Vernonia arborescens*, 7/IV/1996, 1 female. Feeding associations: Compositae in Costa Rica (Mound and Marullo 1996).

***Frankliniella insularis* (Franklin, 1908).**
This thrips is widespread throughout Central America and common in Panama (Mound and Marullo 1996). Sampling data: 2189 females and 853 males. Feeding associations: It is a minor pest in the flower of leguminous crops such *Pachyrhizus* and Cajanus and very common in red flowers of *Malvaviscus* in Costa Rica and Brazil (Mound and Marullo 1996). We have found both sexes in *Cajanus cajan* (Fabaceae), *Lagerstroemia speciosa* (Lythraceae), *Phryganocydia corymbosa, Arrabidaea candicans, Ceratophytum tetragonolobum* (Bignoniaceae), *Maripa panamensis* (Convolvulaceae), *Tabernaemontana arborea* (Apocynaceae), *Gustavia superba* (Lecythidaceae), *Hibiscus sp.* (Malvaceae).

***Frankliniella invasor* Sakimura, 1972.**
This species was collected from *Schawartzia simplex* and *Pseudobombax* flowers in Barro Colorado Island (Mound and Marullo 1996). Sampling data: 570 females and 83 males. Feeding associations: This species was described on *Acacia glauca* flowers from Hawaii. Mound and Marullo (1996) recorded both sexes in flowers of *Pseudobombax* (Bombaceae) in Panama and in *Allophylus occidentalis* (Sapindaceae) in Costa Rica. We have found females and males in *Pseudobombax septenatum*, *Jacaranda copaia*, *Tabebuia rosea* (Bignoniaceae), *Mangifera indica* (Anacardiaceae) and *Cordia alliodora* (Boraginaceae).

***Frankliniella kelliae* Sakimura, 1981.**
New records: University of Panama, *Mangifera indica*, 19/IV/2009, 4 females; University of Panama, *Lagustroemia* sp., 19/IV/2009, 5 females; Valle de Antón, *Cucumis melo*, 22/IV/2009 1 female; Tumba muerto, *Tabebuia rosea* 21/IV/2009, 2 females. Feeding associations: Described from Jamaica, this species is widespread on various flowers in the northern Caribbean (Mound and Marullo 1996). We have only found females in Panama.

***Frankliniella kiesteri* Retana and Mound, 1995.**
New records: Parque Metropolitano, flowers from canopy trees, 20/IV/2005 11 females and 1 male; Barro Colorado Island, *Miconia lonchophylla,* 25/V/1995, 1 female; Pipe Road Line: *Jacaranda caucana*, 20/IV/1995, 9 females and 20 males; *Croton billbergianus*, 5/V/1995, 7 males; *Miconia impetiolaris var. pandurifolia*, 5/V/1996, 3 females; Arraijan, *Miconia argentea*, 05/IX/2009, 1 female. Feeding associations: We have found both sexes in *Jacaranda caucana* (Bignoniaceae).

***Frankliniella minuta* (Moulton, 1907).**
Widespread in Central America (Mound and Marullo 1996), it is usually a montane species, living in the flowers of various Compositae. Sampling data: 14 females and 3 males in montane areas. Feeding associations: We have

found isolated specimens in Compositae plants.

***Frankliniella occidentalis* (Pergande, 1895).**
We have collected 348 females and 49 males in different crops throughout Panama. Feeding associations: Some populations can exhibit a considerable degree of host specificity, although the species as a whole is considered to be highly polyphagous. In Panama it is very abundant in various crops in Chiriqui Province.

***Frankliniella panamensis* Hood, 1925.**
Sampling data: 153 females and 20 males in montane areas. Feeding associations: Unfortunately, this species has never been collected from any particular plant in large numbers, although isolated individuals have been taken from flowers in Costa Rica quite commonly, particularly in montane areas (Mound and Marullo 1996). We have found both sexes in montane areas of Chiriqui Province, close to Baru volcano in flowers of *Sechium edule* (Compositae).

***Frankliniella parvula* Hood, 1925.**
New records: 803 females and 307 males. Feeding associations: In Costa Rica, adults have been taken in large numbers from the flowers of *Bixa orellana* (Bixaceae) and *Eugenia braziliensis* (Myrtaceae) and in *Theobroma cacao* (Sterculiaceae) (Mound and Marullo 1996). We have found both sexes in *Solanum hayesii*, *Brunfelsia pauciflora* (Solanaceae), *Maripa panamensis* (Convolvulaceae), *Gustavia superba* (Lecythidaceae), *Cydista aequinoctialis* (Bignoniaceae), *Tibouchina longifolia* (Melastomataceae), *Musa spp.* (Musaceae), *Celosia argentea* (Amaranthaceae).

***Frankliniella pulchella* Hood, 1935.**
Ten females and 6 males collected in Barro Colorado Island from *Arrabidaea verrucosa*, 3 females and 1 male from *Cydista aequinoctalis*, 2 females and 3 males from *Phryganocydia corymbosa* by L.A. Mound and 6 females and 6 males from *Clitoria javitensis* flowers in Bohio (Mound and Marullo 1996). Sampling data: 238 females and 135 males. Feeding associations: We have found both sexes in *Vismia baccifera* (Clusiaceae), *Clitoria javitensis* (Fabaceae), *Mouriri myrtilloides* (Melastomataceae), *Clibadium surinamense* (Asteraceae), *Guazuma ulmifolia* (Sterculiaceae), *Paragonia pyramidata, Cydista aequinoctialis, Ceratophytum tetragonolobum, Pachyptera kerere, Pleonotoma variabilis* (Bignoniaceae).

***Frankliniella schultzei* (Trybom, 1910).**
New record: Coclé, *Cucumis citrullus*, 22/IV/2009, 1 female. Feeding associations: It is a common species in South America. It has been seen in large numbers in southern Brazil on cultivated flower crops such as Chrysanthemum and Gladiolus (Mound and Marullo 1996).

***Frankliniella spinosissima* Johansen and Mojica-Guzman, 1989.**
New record: Valle de Antón, Compositae, 22/IV/2009, 1 female. Feeding associations: Unknown.

***Frankliniella standleyana* Hood, 1935.**
Sampling data: 158 females and 96 males have been collected. Feeding associations: Mound and Marullo (1996) recorded the flowers of Melastomataceae species as a potential host. We have found females and males in flowers of *Conostegia speciosa, Aciotis rostellata, Topobea parasitica* (Melastomataceae), *Pseudobombax septenatum* (Bombaceae), *Sauvagesia erecta* (Ochnaceae), *Anemopaegma orbiculatum* (Bignoniaceae).

***Frankliniella vargasi* Retana and Mound, 1995.**
We have collected 122 females and 16 males throughout Panama. Feeding associations: Mound and Marullo (1996) stated that this species is only known from a single female collected in Panama. We have collected both sexes in flowers of *Clibadium surinamense* and *Tridax procumbens* (Compositae).

***Frankliniella varipes* Moulton, 1933.**
We have collected four females in the montane areas of Chiriqui province. Feeding associations: Mound and Marullo (1996) collected isolated females from *Miconia longifolia*, *Impatiens balsamina* (Balsaminaceae) and *Eschweilera* (Lecythidaceae) flowers in Costa Rica. Unfortunately we did not find both sexes in Panama.

***Frankliniella williamsi* Hood, 1915.**
New records: 314 females and 64 males in different crops throughout Panama. Feeding associations: Restricted to *Zea mays* and commonly found on fresh green leaves of young plants of this crop (Mound and Marullo 1996). We have also collected both sexes in grasses and young leaves of water and honey melon plants.

***Frankliniella zeteki* Hood, 1925.**
Sampling data. Barro Colorado Island, 3/IV/1996, *Maripa panamensis*, 1 female; *Clibadium surinamense*, 1 male. Feeding associations: Mound and Marullo (1996) collected both sexes in *Miconia* flowers (Melastomataceae).

***Frankliniella zurqui* Retana and Mound, 1995.**
We have collected 21 females and 1 male. Feeding associations: This species is known from a single series of specimens collected in Costa Rica on flowers of *Polygonum* (Polygonaceae). We have collected females in flowers of Melastomataceae (*Miconia*) Bignoniaceae (*Cydista*), Apocynaceae (*Tabernaemontana)* and Compositae (*Tridax, Clibadium*).

***Microcephalothrips abdominalis* (Crawford DL, 1910).**
Sampling data: 829 females and 82 males have been collected. Feeding associations: Widespread in the tropics and abundant in flowers of various ruderal Compositae. We have found females and males in *Tridax procumbens, Wedelia trilobata*, *Chrysanthemum* sp. (Compositae).

***Plesiothrips aberrans* (Crawford JC, 1941).**
Sampling data: 2 females and 1 male have been collected. Feeding associations: This species presumably lives on Gramineae.

***Plesiothrips brunneus* Hood 1936.**
Sampling data: Parque Metropolitano, Panama City, 6/IX/2007, 1 female; El Valle, grass, 23/VIII/2007, 1 female. Feeding associations: This species presumably lives on

Poaceae.

***Psectrothrips interruptus* (Hood, 1957).**
Collected in Panama by L.A.Mound (Palmer and Mound 1985). Sampling data: Sora, Manglarito, *Origanum vulgare*, 20/VI/2009, 11 females and 13 males. Feeding associations: Mound and Marullo (1996) collected a few males from *Xylophragma* flowers (Bignoniaceae) in Costa Rica.

***Psectrothrips palmerae* Mound and Marullo, 1996.**
Sampling data: 161 females and 38 males. Feeding associations: Mound and Marullo (1996) collected 1 female from *Cassia moschata* and 4 females from *Tabebuia pentaphylla* flowers in Barro Colorado Island. We have found both sexes in *Jacaranda copaia, Cydista aequinoctialis* (Bignoniaceae) and in *Ceratophytum tetragonolobum* (Ceratophyllaceae).

***Psectrothrips spadix* (Hood, 1916).**
Sampling data: Penonomé, Malvaceae, 22/IX/2007, 3 females and 1 male. Feeding associations: Unknown.

***Retanathrips funestus* (Hood, 1915).**
We have collected 124 females and 20 males. Feeding associations: According to our collections, (males and females) probably phytophagous on tropical trees (Tiliaceae, Maranthaceae, Rubiaceae and Bignoniaceae).

***Retanathrips silvestris* (Hood, 1935).**
Sampling data: 2 females. Feeding associations: Unknown, probably lives on the leaves of forest trees (Mound and Marullo 1996).

***Rhamphothrips pandens* Sakimura, 1983.**
We have collected 9 females. Feeding associations: Little is known of their biology, although they are probably all leaf-feeding (Mound and Marullo 1996). We have found females in plants belonging to different botanic families as Melastomataceae (*Conostegia* sp.) and Bignoniaceae (*Arrabidea* sp., and *Adenocalymma inundatum*).

***Salpingothrips minimus* Hood, 1935.**
Sampling data: 7 females and 3 males have been collected. Feeding associations: These species probably live on the leaves of legumes (Mound and Marullo 1996). Mound and Marullo (1996) found females and males in *Macuna* flowers in Costa Rica.

***Scirtidothrips torquatus* Hood, 1954.**
New records: Valle de Antón, *Impatiens walleriana*, 22/IV/2009, 1 female; Arraijan, *Enterolobium cyclocarpum*, 5/IX/2009, 6 females and 1 male. Feeding associations: we found both sexes in flowers of *Enterolobium cyclocarpum* (Fabaceae).

***Scirtothrips oligochaetus* (Karny, 1927).**
New records: Boquete, *Rosa* spp., 10/III/2009, 2 females. Feeding associations: Unknown. Mound and Marullo (1996) recorded two females collected on *Dioscorea alata* (Dioscoreaceae) in Barbados.

***Scirtothrips panamensis* Hood, 1935.**
Sampling data: 38 females and 13 males have been collected. Feeding associations: *Manihot esculenta*.

***Trichromothrips xanthius* (Williams, 1917).**
We have collected 6 females on grasses. Feeding associations: *Cattleya* sp.; *Cypripedium* sp.; *Laelia* sp.; *Odontoglossum* sp. (Orchidaceae). This species is taken in greenhouses around the world (Nakahara 1993). We have collected in grasses (Poaceae).

***Thrips orientalis* (Bagnall, 1915).**
We have collected 4 females and 5 males in the quarantine area of the Panama Canal. Feeding associations: Mound and Marullo (1996) stated *Gardenia* flowers as host plant in the oriental region and *Jasminum* in Florida and the Virgin Islands. We have collected both sexes in *Jasminum* sp. (Oleaceae).

***Thrips palmi* Karny, 1925.**
New records: 11 females and 47 males have been collected. Feeding associations: This polyphagous Oriental species is now a widespread and serious crop pest throughout the Caribbean from Florida to Venezuela. We have found both sexes in Cucurbitaceae and associated weeds (*Amaranthus* spp.) and in *Zea mays*.

***Thrips pallicornis* Hood, 1912.**
New records: Valle de Antón, grass, 22/IV/2009, 5 females. Feeding associations: Unknown.

***Thrips simplex* (Morison, 1930).**
We have collected 18 females and 1 male in ornamental flowers of Chiriqui Province. Feeding associations: This species is a pest of cultivated *Gladiolus*, although populations can also be found on other Liliaceae. Mound and Marullo (1996) collected both sexes in flowers of *Neomarica gracilis* (Iridaceae). We have found females in *Hippeastrum* (Amaryllidaceae).

***Thrips tabaci* Lindeman, 1889.**
New records: 80 females have been collected in different crops. Feeding associations: It is highly polyphagous and is also a vector of tomato spotted wilt virus, but at times it is probably also predatory on suitable small sized arthropods (Mound and Teulon 1994).

***Thrips trehernei* Priesner, 1927.**
New records: Boquete, Alto Chiquero, *Agapanthus africanus*, 10/III/2009, 16 females. Feeding associations: This species is common in white (Cruciferae) and yellow flowers (Asteraceae) in Europe. In Panama we have found a good population of females in *Agapanthus* (Alliaceae).

PHLAEOTHRIPIDAE-IDOLOTHRIPINAE

***Diceratothrips bicornis* Bagnall, 1908.**
Sampling data: 9 females and 5 males in dead leaves have been collected.

***Elaphrothrips affinis* (Bagnall, 1908).**

Sampling data: 11 males have been collected in dead leaves.

***Elaphrothrips dampfi* Hood, 1940.**
New records: Altos de Cristo, Darién, dead leaves, 15/II/2009, 8 females and 4 males.

***Elaphrothrips foveicollis* (Bagnall, 1908).**
New records: Gamboa, dead leaves, 24/IV/2009, 2 females and 7 males.

***Elaphrothrips laevicollis* (Bagnall, 1910).**
We have collected 15 males and 7 females in dead leaves in different provinces of Panama.

***Ethirothrips angusticornis* (Bagnall, 1924).**
Sampling data: Tocumen, dried leaves, 10/VII/1986, 1 female and 1 male.

***Gastrothrips anolis* Morgan, 1925.**
Sampling data: Santa Fé de Darién, dried grass, 7/IX/2007, 2 females and 1 male.

***Nesothrips lativentris* (Karny, 1913).**
Sampling data: 75 females and 27 males have been collected in dried plants throughout Panama. Fungal associations: We have found both sexes on *Polyporus* fungi associated with a dead tree trunk.

***Pseudocryptothrips gradatus* (Hood, 1925).**
Sampling data: El Valle, dried grasses, 23/VIII/2007, 1 female.

***Zeugmatothrips hoodi* Priesner, 1927.**
New records: Las Paredes de Ocú, Herrera, dead leaves of *Musa* sp., 31/XII/2007 4 females and 3 males; Parque Metropolitano, Panama City, 1 female and 2 males in dead leaves.

***Zeugmatothrips priesneri* Hood, 1935.**
Sampling data: Parque Metropolitano, Panama City, 6/IX/2007 4 females and 1 male; La Soberanía, dead leaves of *Tithonia*, 26/VIII/2007, 1 female.

PHLAEOTHRIPIDAE-PHLAEOTHRIPINAE

***Adraneothrips alternatus* Hood, 1925.**
Sampling data: 99 females and 37 males have been collected in dried leaves.

***Adraneothrips desocellatus* (Priesner, 1933).**
New records: Parque metropolitano, dried leaves of *Bambusa* sp., 6/IX/2007, 1 female.

***Adraneothrips diligens* Hood, 1935.**
Sampling data: we have collected 9 females and 3 males in dried grasses.

***Adraneothrips tibialis* (Hood, 1914).**
New records: Las Paredes, 30/12/2007 1 female.

***Adraneothrips uniformis* Hood, 1925.**
New records: Altos de Pacora, Cerro Azul, 20/VIII/2006, 2 females and 1 male; Cerro azul, 3/VIII/2007 1 female and 1 male; Penonomé, dead leaves of *Cajanus cajan*, 22/IX/2007, 1 female and 2 males.

***Aleurodothrips fasciapennis* (Franklin, 1908).**
New records: University of Panamá, grass, 19/IV/09, 1 male. Feeding associations: Predator of scale insects and whitefly immature stages (Palmer and Mound 1991).

***Androthrips ramachandrai* Karny, 1926.**
New records: 12 females and 5 males have been collected inside false galls of *Gynaikothrips uzeli* in *Ficus benjamina* throughout Panama. Feeding association: This species assumed to be predacious, and it is associated with gall-inducing thrips (Mound 2009).

***Bamboosiella cingulata* (Hood, 1919).**
Sampling data: Escleré, Soná, Veraguas, 21/V/2008 1 female; Valle de Antón, grasses, 22/IV/2009, 2 females; Loma Linda, dried grasses, 31/VIII/2007, 3 females. Feeding associations: Probably feeds on fungal hyphae of dead grasses.

***Carathrips delicatulus* (Hood, 1939).**
Sampling data: Camino del Valle, dead Asteraceae, 23/VIII/2007 1 male.

***Carathrips mediamericanus* (Hood, 1934).**
Sampling data: we have collected 4 females on dead leaves in different provinces of Panama.

***Chirothripoides typicus* Bagnall, 1915.**
New records: Parque Metropolitano, Panama City, dried leaves of *Tithonia*, 1 female. Mound and Marullo (1996) recorded this species on dead twigs in Costa Rica.

***Docessissophothrips corticis* (Hood, 1914).**
Sampling data: Parque de la Soberanía, dead leaves, 26/VIII/2007, 1 male.

***Eupathithrips meizon* Hood, 1955.**
New records: Los Planes Chiriquí, dried cucumber, 13/VIII/2008, 1 female.

***Eurythrips ampliventralis* Hinds, 1902.**
Sampling data: Pipe Road Line: *Acalypha macrostachya*, 7/IV/1996, 1 female.

***Eurythrips batesi* (Watson, 1935).**
New records: El Valle, dead wood 23/VIII/2007, 1 female.

***Eurythrips tristis* Hood, 1941.**
New records: Las Paredes, dried leaves of *Amaranthus spinosus*, 27/XII/2007, 2 females.

***Gomphiothrips mercedes* Mound and Marullo, 1996.**
New records: University of Panama, Panama City, Flowers of *Lagerstroemia*, 19/IV/2009, 3 females; Pipe Road Line: *Acalypha macrostachya*, 22/III/1995, 1 female.

***Gynaikothrips uzeli* (Zimmermann, 1900).**

New records: 2450 females and 897 males have been collected throughout Panama. Feeding association: *Ficus benjamina.*

***Haplothrips gowdeyi* (Franklin, 1908).**
New records: 111 females and 1 male have been collected throughout Panama. Feeding associations: It is one of the most common Compositae flower-thrips in Panama. We have found both sexes in *Wedelia trilobata* (Compositae).

***Haplothrips graminis* Hood, 1912.**
Sampling data: 95 females and 29 males have been collected. Feeding associations: grasses

***Haplothrips saidi* (Retana –Salazar and Soto Rodriguez, 2007).**
New records: 39 females and 28 males have been collected throughout Panama. Feeding associations: grasses.

***Holopothrips inquilinus* (Bournier, 1993).**
New records: Cerro azul, *Lantana camara*, 30/VIII/2007, 1 female.

***Holopothrips signatus* Hood, 1914.**
Sampling data: we have collected 5 females and 3 males in Pipe Road Line. Feeding associations: We have found both sexes in leaves of *Acalypha macrostachya* (Euphorbiaceae)

***Hoplandrothrips affinis* Hood, 1915.**
New records: Tortí, dried *Zea mays*, 7/IX/2007, 1 male.

***Hoplandrothrips erythrinae* Priesner, 1925.**
Sampling data: 29 females and 18 males have been collected in dead leaves.
**Hoplandrothrips flavipes* Bagnall, 1923.
New records: Guarumel, dead leaves of *Mangifera indica*, 29/VIII/2007 2 males; Escuela Emberá, Darién, 7/IX/2007, 4 females and 1 male; Santiago, Hotel Piramidal, dried leaves of grasses, 2/IX/2007, 1 female.

***Hoplandrothrips nigricestus* Hood, 1933.**
Sampling data: Barro Colorado Island: *Odontadenia macrantha* leaves, 1/V/1996, 1 male; *Lacmellea panamensis* leaves, 15/V/1996, 1 female and 3 males; *Tabebuia guayacan* leaves, 15/V/1996, 2 females and 7 males.

***Hoplandrothrips jennei* (Jones, 1912).**
New records: Escuela Emberá, Darién, dead leaves, 7/IX/2007, 2 males; Barro Colorado Island: *Pseudobombax septenatum* leaves, 29/III/95, 1 female; *Pseudobombax septenatum* leaves, 3/IV/1996, 1 male; *Odontadenia macrantha* leaves, 1/V/1996, 1 male.

***Hoplothrips graminis* (Hood, 1934).**
Sampling data: Parque Metropolitano, Panama City, dried leaves, 1 female; Las Cabras, dried grasses, 1/IX/2007, 2 females.

***Hoplothrips militaris* (Hood, 1934).**
Sampling data: Zona del Canal, 8/05/2005, 1 female; Panama East, leaf litter, 1/VI/2003 Berlese funnel, 2 females.

***Hoplothrips moultoni* (Hood, 1934).**
Sampling data: Ipeti, Darién, leaf litter, 1/VI/2003, 1 female.

***Karnyothrips melaleucus* (Bagnall, 1911).**
Sampling data: Alanje, dried grass, 29/VIII/2007, 1 female.

***Karnyothrips merrilli* (Watson, 1920).**
Sampling data: 25 females and 17 males have been collected, mostly in grasses.

***Karnyothrips ochropezus* Hood, 1934.**
Sampling data: 30 females and 21 males have been collected in dried grasses.

***Leptothrips vittipennis* Hood, 1938.**
Sampling data: 19 females and 9 males in different plants throughout Panama.

***Liothrips zeteki* Hood, 1913.**
Sampling data: 9 females and 1 male have been collected in different provinces of Panama.

***Macrophthalmothrips hemipteroides* (Priesner, 1921).**
Sampling data: we have collected 2 females on dead leaves in Darien Province.

***Metriothrips midas* Hood, 1936.**
Sampling data: Valle de Antón, grass, 22/IV/2009, 1 female.

***Pistillothrips guadalupae* Johansen, 1982.**
New records: Pipe Road Line, *Luehea seemanni*, 2/III/2006, 1 male.

***Psalidothrips longistylus* Okajima, 1983.**
New records: Parque Metropolitano, dried leaves, 6/IX/2007 1 female and 2 males.

***Pygmaeothrips angusticeps* (Hood, 1908).**
Sampling data: Alanje, Chiriquí, *Polyporus* sp., 29/VIII/2007 26 females and 11 males; Parque metropolitano, Panama City, dead leaves, 6/IX/2007 1 female.

***Sophiothrips spadix* Hood, 1954.**
New records: Santa Fé de Darién, dead branches of *Theobroma cacao*, 7/IX/2007 3 females and 2 males; El Valle, dead wood, 23/VIII/2007, 1 female.

***Stephanothrips occidentalis* Hood and Williams, 1925.**
Sampling data: 5 females and 1 male have been collected in dead leaves.

***Terthrothrips gracilicornis* (Hood, 1925).**
New records: Camino Viejo a Pacora, grass, 30/VIII/2007, 1 female.

***Tropothrips nigripes* Stannard, 1954.**
New records: Santa Fé de Darién, dead leaves of *Theobroma cacao*, 7/IX/2007, 1 female.

***Tylothrips clavivestis* (Hood, 1935).**
Sampling data: Santa Fé de Darién, dead branches of *Theobroma cacao*, 7/IX/2007, 2 females and one male; Las Paredes, dried grasses, 30/XII/2007, 1 female.

***Tylothrips osborni* (Hinds, 1902).**
New records: Pacora, grasses, 30/VIII/2007, 1 female. This species has been collected regularly in Spain (Goldarazena and Mound 1988) and in USA (Goldarazena and Mound 2006).

Two hundred and fifty six species have been collected and named up till now in Panama. From this compilation, throughout the sampling we have added 87 new-recorded species from Panama (these species are marked with an asterisk in the species checklist). The diversity of a thrips fauna is presumably related, in some way, to the diversity of the local flora and the range of niches this provides. Almost 9000 species of plants are known from Panama, 1222 are endemics and 7778 are shared with other countries (World Conservation Monitoring Centre www.wcmc.org.uk). Burger (1985) points out that many tree and plant species have considerably geographic ranges. Similarly, Lellinger (1985) indicates that only 12 of the 687 pteridophytes known from Panama are endemic, and that both Peru and Mexico have more than 40% of their known species in common with Panama and the larger Caribbean Islands more than 30%. The flora of the isthmus and its associated insects seem to be derived more through immigration from north and south than from local speciation, and this conclusion applies equally to the Thysanoptera (Mound and Marullo 1996). The winds, especially hurricanes reach the isthmus infrequently but they commonly move widely along the Caribbean island. This could be the mechanism of movement of many insects, including some pest thrips, to spread from one country to another in the Central America and the Caribbean Areas. *Thrips palmi* has been recently introduced in Panama, and it is very common in crops of honey and watermelon and in oriental vegetables. Three years ago was introduced in Costa Rica throughout the border of Bocas del Toro, probably for the illegal introduction of fruits (Goldarazena unpublished).

There is a group of about 45 species that have been widely introduced around the world, including many pests as well as many species associated with fungi on dead branches (Mound 1983). For example *Merothrips floridensis* or *Tylothrips osborni* (Table 1) are fungus-feeding species that were probably transported many years ago on sailing ships, in association with straw and palm fronds used as fodder and bedding (Mound 1983). Bananas and orchids are transported as planting material, and their thrips pests go with them. International trade market of flowers (Roses) and vegetables (lettuce and strawberries), have introduced The Western Flower Thrips, *Frankliniella occidentalis*, in Chiriqui Province. Many of this species are collected in Panama in the Agroecosystems (Table 1). The thrips fauna in the crops is much monotonous than in the natural ecosystems.

Distribution of thrips species within Panama, both in space and time, is affected by the altitude and seasons. Similarly, there seem to be considerable differences in the thrips fauna between sites with different rainfall patterns, and at different altitudes. Thrips seem to be least common in rainy season (May to November) and more abundant during dry season (mid December to April). *Frankliniella panamensis* and *F. fallaciosa* are quite common species at altitudes of 1400 m or more in the Volcan Barú area, but they are rarely found at lower altitudes. *Elaphrothrips* species are also rarely taken at altitudes of 1200 m on montane areas of Chiriqui Province, although they are abundant at lower altitudes on dead leaves. Our results are coincident with the studies that were carried out in Costa Rica (Mound and Marullo 1996).

Thrips species vary greatly in their degree of host specificity. Few species seem to be strictly monophagous. From the point of view of conservation of species this could be take into account, especially if the endemic plants are threatened by extinction for transformation of the tropical ecosystems (due to climatic change, use of the land etc). Fungus feeding thrips populations (Idolothripinae and some Phlaeothripinae) often show considerable spatial aggregation (Mound and Teulon 1994). Sampling repeatedly such species, with populations that are widely dispersed but locally aggregated could be led into local extinctions.

Table 1. Species collected in Agroecosystems and Natural Habitats.

SPECIES	AGROECOSYSTEMS	NATURAL HABITATS
Aeolothrips microstriatus	X	X
Franklinothrips vespiformis	X	X
Heterothrips spp.		X
Caliothrips fasciatus	X	X
Caliothrips insularis		X
Caliothrips nanus	X	X
Caliothrips phaseoli	X	
Dinurothrips hookeri		X
Elixothrips brevisetis	X	X
Heliothrips haemorrhoidalis	X	X
Hoodothrips brevipilus		X
Selenothrips rubrocinctus	X	
Leucothrips theobromae		X
Hydatothrips guanacastei		X
Hydatothrips sternalis		X
Neohydatothrips gracilipes		X
Neohydatothrips inversus		X
Neohydatothrips signifier		X
Neohydatothrips williamsi		X
Anaphothrips obscurus	X	X
Anaphothrips sudanensis	X	X
Aptinothrips rufus	X	
Arorathrips crassiscelis		X
Arorathrips fulvus	X	X
Arorathrips mexicanus	X	X
Arorathrips xanthius	X	X
Baileyothrips limbatus		X
Bolacothrips striatopennatus		X
Bravothrips tibialis		X
Bregmatothrips venustus	X	X
Caprithrips insularis		X
Chaetanaphothrips leeuweni	X	X
Chaetanaphothrips orchidii	X	X
Chaetanaphothrips signipennis	X	X
Chaetisothrips gardeniae		X
Chaetisothrips striatus		X
Coremothrips pallidus		X

Table 1. *Continued.*

SPECIES	AGROECOSYSTEMS	NATURAL HABITATS
Corynothrips stenopterus	X	
Dendrothrips innoxius		X
Dichromothrips orchidis	X	
Echinothrips americanus	X	X
Frankliniella altura		X
Frankliniella borinquen	X	X
Frankliniella brevicaulis	X	X
Frankliniella breviseta		X
Frankliniella bruneri	X	X
Frankliniella brunnea	X	X
Frankliniella cephalica	X	X
Frankliniella chamulae		X
Frankliniella cotobrusensis		X
Frankliniella curiosa		X
Frankliniella curta		X
Frankliniella desmodii		X
Frankliniella distinguenda	X	X
Frankliniella diversa		X
Frankliniella fallaciosa		X
Frankliniella floydandrei		X
Frankliniella fulvipennis		X
Frankliniella fulvipes		X
Frankliniella fusca	X	X
Frankliniella gardeniae	X	X
Frankliniella gossypiana		X
Frankliniella hansoni		X
Frankliniella insularis	X	X
Frankliniella invasor	X	X
Frankliniella kelliae	X	X
Frankliniella kiesteri	X	X
Frankliniella minuta		X
Frankliniella occidentalis	X	
Frankliniella panamensis		X
Frankliniella parvula	X	X
Frankliniella pulchella		X
Frankliniella schultzei	X	
Frankliniella spinosissima		X
Frankliniella standleyana		X
Frankliniella vargasi		X
Frankliniella varipes		X
Frankliniella williamsi	X	X
Frankliniella zeteki		X
Frankliniella zurqui		X
Microcephalothrips abdominalis	X	X
Plesiothrips aberrans	X	X
Plesiothrips brunneus	X	X
Psectrothrips interruptus		X
Psectrothrips palmerae		X
Psectrothrips spadix		X
Retanathrips funestus		X
Retanathrips silvestris		X
Rhamphothrips pandens		X
Salpingothrips minimus		X
Scirtidothrips torquatus		X
Scirtothrips oligochaetus	X	
Scirtothrips panamensis	X	
Trichromothrips xanthius	X	X
Thrips orientalis	X	
Thrips palmi	X	
Thrips pallicornis		X
Thrips simplex	X	
Thrips tabaci	X	
Thrips trehernei	X	X
Diceratothrips bicornis		X
Elaphrothrips spp.		X
Ethirothrips angusticornis		X
Gastrothrips anolis		X
Nesothrips lativentris	X	X
Pseudocryptothrips gradatus		X
Zeugmatothrips spp.		X
Adraneothrips spp.		X
Aleurodothrips fasciapennis	X	X
Androthrips ramachandrai	X	
Bamboosiella cingulata		X
Carathrips delicatulus		X
Carathrips mediterraneus		X
Chirothripoides typicus		X
Docessissophothrips corticis		X
Eupathithrips meizon		X
Eurythrips spp.		X
Gomphiothrips mercedes	X	X
Gynaikothrips uzeli	X	
Haplothrips gowdeyi	X	X
Haplothrips graminis		X
Haplothrips saidi		X
Holopothrips spp.		X
Hoplandrothrips affinis		X
Hoplandrothrips spp.		X
Hoplothrips spp.		X
Karnyothrips melaleucus	X	X
Karnyothrips merrilli		X
Karnyothrips ochropezus		X
Leptothrips vittipennis		X
Liothrips zeteki		X
Macrophthalmothrips hemipteroides		X
Metriothrips midas		X
Psitillothrips guadalupae		X
Psalidothrips longistylus		X
Pygmaeothrips angusticeps		X
Sophiothrips spadix		X
Stephanothrips occidentalis		X
Terthrothrips gracilicornis		X
Tropothrips nigripes		X
Tylothrips spp.		X

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